Title: Optimizing the channel and delay selection in optical switching by means of Markov Decision Processes

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Abstract:

In optical packet-switching networks, packet contention is resolved by sending contiguous packets over different channels, and/or by buffering them with different delays from a set of Fiber Delay Lines (FDLs). The corresponding channel and delay selection (CDS) algorithm bases its decision on the horizon value (or queue length) of the different channels (or queues). Due to the quantized number of possible delays, well-known policies such as join-the-shortest-queue are suboptimal in terms of packet loss, and until recently, a policy known as MING (MINimal Gap) was assumed to provide minimal loss.

Relying on Markov decision processes (MDPs), we reexamine the optimality of MING. This enables us to construct CDS algorithms that outperform MING, and this for any value of the traffic load. In this talk we give an overview of the developed method and the obtained results. Also, we discuss burst-size-dependent and load-dependent scheduling, two stochastic mechanisms that, together with preventive drop, allow to further enhance the algorithm's performance.